To review the different types of neurons associated with the ANS.
To clearly identify the position and role of the sympathetic trunk & collateral ganglia.
To address the two different types of receptors for neurotransmitters of the sympathetic ANS:
- Cholinergic Receptors
- Adrenergic Receptors
To relate how drugs interact (influence) the receptors seen in the sympathetic ANS.

Types of Neurons of ANS

**Ganglion** – Collection of nerve cell bodies outside of the CNS.

**Preganglionic Neurons** – CB in CNS which projects its axon to a *peripheral ganglion*

**Postganglionic Neurons** – CB in peripheral ganglion its axon projects to an *effector*.

**Pathways with Synapses in Collateral Ganglia**
- Most fibers from T₅ – L₁ synapse in collateral ganglia
- They form thoracic, lumbar, and sacral splanchnic nerves
- Their ganglia include the celiac and the superior and inferior mesenteric
Neurotransmitter Effects
- Somatic nervous system
  - All somatic motor neurons release acetylcholine (ACh)
  - Effects are always stimulatory
- ANS
  - Preganglionic fibers release ACh
  - Postganglionic fibers release norepinephrine or ACh at effectors
  - Effect is either stimulatory or inhibitory, depending on type of receptors

Neurotransmitters
I. Cholinergic fibers release the neurotransmitter ACh
  - All ANS preganglionic axons
  - All parasympathetic postganglionic axons
II. Adrenergic fibers release the neurotransmitter NE
  - Most sympathetic postganglionic axons
  - Exceptions: sympathetic postganglionic fibers secrete ACh at sweat glands and some blood vessels in skeletal muscles

Cholinergic Receptors
- Two types of receptors bind ACh
  1. Nicotinic (stimulatory)
     Found on:
     - All ganglionic neurons both (sympath & para)
     - Motor end plates of skeletal muscle cells
     - Hormone-producing cells of the adrenal medulla
  2. Muscarinic (inhibitory or excitatory)*
     Found on:
     - All effector cells stimulated by postganglionic cholinergic fibers
     * depends on target organ

Adrenergic Receptors
- Two types
  - Alpha (α) (subtypes α₁, α₂) - Excitatory
  - Beta (β) (subtypes β₁, β₂, β₃)
- Effects of NE depend on which subclass of receptor predominates on the target organ.
  - β₁ – increases heart activity
  - β₂ – relaxes smooth muscle of bronchioles
Effects of Drugs

- Over-the-counter drugs for colds, allergies, and nasal congestion
  - Stimulate \( \alpha \)-adrenergic receptors
  - Beta-blockers
  - Drugs that attach to \( \beta_2 \) receptors to dilate lung bronchioles in asthmatics; other uses

Visceral Reflexes

- Visceral reflex arcs have the same components as somatic reflexes
- Main difference: visceral reflex arc has two neurons in the motor pathway
- Visceral pain afferents travel along the same pathways as somatic pain fibers, contributing to the phenomenon of referred pain

HW for Week 4

Due in lab:
Diseases & Disorders of the nervous system W.S.
Labeling:
  - pg 337 (spinal cord)
  - pg. 378 (eye)

Study Guide will be provided for in lab (Tuesday)
Preview dissection of eye and eye related reflexes.